AIR POLLUTION TAKING AN INTERCONTINENTAL EXPRESS HIGHWAY IN A BOMB


(1) Department of Ecology, Technical University Munich, (2) Institute of Atmospheric Physics, DLR, (3) Institute of Environmental Physics, University of Bremen, (4) Institute of Environmental Physics, Heidelberg University, (5) NOAA Aeronomy Laboratory

Intercontinental transport (ICT) of trace substances normally occurs on timescales ranging from a few days to several weeks.
In this paper we present an extraordinary episode, where pollution transport from North America to Europe took only one day.
The transport mechanism in this case was exceptional, as it involved an explosively generated cyclone, a so-called meteorological bomb.
To our knowledge, this is the first study describing pollution transport in a bomb.
The discovery of this event was based on transport model calculations and satellite measurements of NO$_2$, a species with a relatively short lifetime in the atmosphere, which could be transported that far only because of the high wind speeds produced by the bomb.
Since about 50 bomb events per year occur in the Northern Hemisphere, most of them downstream of Asia and North America, there is possibly some climatological relevance of this transport mechanism for the global re-distribution of air pollution, particularly of short-lived species.